Hawkey, K., James, J., & Tidmarsh, C. (2016). Greening the curriculum? History joins 'the usual suspects' in teaching climate change. *Teaching History*, (162), 32-41. http://www.history.org.uk/publications/resource/8762/teaching-history-162-scales-of-planning

Greening the curriculum? History joins 'the usual suspects ' in teaching climate change

Kate Hawkey, Jon James & Celia Tidmarsh

Perhaps you have heard the news that in 2015 Bristol became the UK's first Green Capital? The European Commission, which launched the Green Capital initiative and made its first city award in 2010, gave the award to Bristol for various reasons, including Bristol's growing green economy, falling carbon emissions, and a rising cycling population. The European Commission accompanied the award with the ambitious suggestion that 'Bristol has great potential to act as a role model for the UK, Europe and the world'.[1]

Towards a Green Capital school curriculum

Within the University of Bristol, a strategic partner of Bristol Green Capital, the Graduate School of Education has used this context to focus attention on the question of what might a Green Capital school curriculum look like? There was local expertise to draw from. The series of texts *Teaching School Subjects as if the Planet Matters*, which are now underway (with editions for geography, English and mathematics currently published) were written and edited by people working within the Graduate School of Education.[2] Furthermore, staff involved in teacher education, including those in history, have developed inter-disciplinary workshops with PGCE student teachers, on themes such as 'Education for Sustainable Development' and 'Making Sense of the Little Ice Age.'[3]

In keeping with the purposes of initial teacher education in universities, student teachers are not only taught how to teach the curriculum but also to critique it. Climate change and the 'post-carbon challenge' have implications for all subjects within the curriculum and this reality is taken seriously in the Bristol Graduate School of Education; these perspectives are routinely included as awareness-

raising activities with pre-service student teachers, some of whom also build such perspectives into their classroom work.[4] Science and geography are often regarded as 'the usual suspects' to teach topics associated with 'green issues', yet there are arguments that all subjects, including history, have contributions to make to such important debates.[5] We at the Graduate School decided to focus in particular on climate change. History's contribution to the project would be to teach 'a little big history of climate change.'[6]

The culture of many primary schools is more attuned to working on themes, in co-curricular ways, than many secondary schools are.[7] Bristol Green Capital started its education work in the primary sector producing, for example, guidance for primary school teachers.[8] Despite being less experienced in this area, PGCE tutors at the University of Bristol were keen to build on the previous small scale inter-disciplinary initiatives which they had run in schools. Our Bristol Green Capital project had two main aims: First, to teach climate change from three subject perspectives, namely geography, science, and history. Each subject discipline could draw on its own particular disciplinary approaches and knowledge to teach climate change.[9] Our second aim was to draw these three different disciplinary perspectives together into a final plenary which invited students to consider possible future action in relation to climate change.

This paper describes the workshops designed by PGCE student teachers on the teaching of climate change, which were taken into five Bristol schools for half-day workshops in June 2015, working with 250 Year 9 students (ages 13-14). The history elements are likely to be of more interest to readers of *Teaching History* of course, although attention is also given to the different aims and perspectives of the other subjects involved, namely geography and science, as well as an evaluation of the whole project and concluding remarks.

History aims

Climate change is not included anywhere in the secondary history curriculum.[10] As such, it might be seen as an unusual choice of subject in which to focus on climate change. On the other hand, it could be argued that a key tenet of the study of history is the 'unending dialogue between the past and the present'.[11] In other words, what is considered significant, and therefore prioritised for study, does change over time at least in part due to the concerns of the present. The current concern with climate change in society at large ensures that the topic has relevance and resonance for secondary school students.[12] A case can be made, therefore, for history to contribute to conversations of contemporary significance drawing on similar and different experiences in the past (in this case of climate change) as well as the longer term causes of current issues. Shemilt develops the relationship between past and future further when he summarises history's contribution thus, 'the disposition to investigate and analyse the past from the perspective of possible futures is a key development in *historical consciousness* and one that transcends the all too common perception that 'the past is dead and gone''.[13]

While the 2014 History National Curriculum does not specifically mention climate change as a topic for study, there are potential opportunities for it to be included. For example, where it states that the curriculum should help students: 'To gain historical perspective by placing their growing knowledge into different contexts, understanding ..... long-term timescales'; 'to understand (both) the long arc of development'; and the statement that the curriculum should include 'the study of an aspect or theme in British history that consolidates and extends pupils' chronological knowledge from before 1066'.[14]

For the school students, the aim was to provide historical background knowledge to help them to understand the historical roots of climate change. This was also an aim for the student teachers who, by and large, lacked this sort of historical knowledge. As a result, becoming more familiar and confident with this 'new' knowledge became an important part of the student teachers' preparation for the workshops.

Geography aims

Debates about climate change are increasingly common in public discourses of society and so it is essential that in school young people are given the space and the tools to consider the information and arguments that they are hearing in these discourses.[15] It is no surprise that the study of climate change features in the geography curriculum as it incorporates many elements, such as weather and climate systems, that are generally recognised as 'geographical'. Climate change appears in the current version of the Key Stage Three (ages 11-14) Geography National Curriculum as well as the compulsory core content for GCSE in 2016.[16]

The geographers' aim for the workshop they planned to run in schools focused on ensuring school students understood the causes, effects and possible solutions of climate change in relation to different countries across the world. A second aim related to the interactions between the geography cohort and their history and science peers in their co-curricular planning of the school workshops. For the geography student teachers, the collaboration with their history and science colleagues gave them opportunities to develop aspects of their own knowledge, which varied depending on the nature of the degree that they had studied. In the preparation for the workshops, those who had followed a more science-focused geography course appreciated discussions of the historians' 'big history' approach, whilst those with a more human geography-focused degree

learned more about the science of climate change.[17] For all the geography cohort, there was the challenge of finding connections between a more scientific approach to climate change and a more humanities-focused perspective and an acknowledgement that any evidence about climate change also needed to be considered in the context of society's values and attitudes.

Science aims

Recent curriculum changes in science at Key Stage 3 and in the core content that must form the basis of new GCSE Science specifications (for September 2016) could be argued to have reversed the 'humanising' of the science curriculum that occurred in the last significant revision in 2007.[18] Out has gone the 'how science works' component, which considered the social practices of scientists and the way that those scientists worked in the world, to be replaced by 'working scientifically', which adopts a more objective approach, focusing on the technical nature of scientific methods. The space for consideration of climate change and other socio-scientific issues appears to have been diminished, both by the nature of the explicit references to the topic and the values that the curriculum espouses.[19]

One of the driving forces behind these changes to the curriculum is the concern over a lack of young people choosing science at higher education level and as a career, and the potential implications for our country's economic competitiveness.[20] However science is worthy of study for its own sake, regardless of whether one is going to become a scientist, as it has a key role in helping young people make sense of the world and their place in it, at both a local and global level.[21] This 'making sense' element was, therefore, a key reason for involving science student teachers in the project, not only in developing young people's understanding of the science that underpins climate change, but also their understanding of the scientific community's position on climate change.

A key reading given to the science student teachers highlighted the problematic nature of the discourse around climate change and how scientists often have difficulties in confronting the arguments of climate change sceptics and deniers.[22] We hoped that our Bristol Green Capital project would enable student teachers to hear a variety of young people's perceptions of climate change, and experience views and attitudes that might differ considerably from their own. An important objective was that student teachers were challenged to think about not only their scientific assumptions, but also their own social values and attitudes.

Language can be a significant barrier in the science classroom and so this project offered the potential for school students to consider the scientific dimension of climate change outside of that formal setting and to break free from the formal modes of discourse.[23] This was achieved by encouraging student teachers to adopt a looser approach to the use of scientific terminology and to articulate explanations and reasoning in everyday language rather than employing the technical and authoritarian language of science which is often unfamiliar and alienating to students. This also applied during the planning stages, where science student teachers had to communicate the consensus, scientific views on climate change to their peers in history and geography. In this way, the science student teachers developed their skills in communicating about climate change, using accessible and not overly specialised language, to both history and geography student teachers as well as school students.

Preparation for the workshops

While primary schools are adept at working in co-curricular ways, we were keen to make best use of the subject specialisms within the secondary school and amongst the PGCE student teachers we were working with. In preparing for the workshops, therefore, each subject group worked separately with their subject tutors leading preparation work and directing the student teachers' reading. Each subject problematised climate change as an issue, thus providing opportunities for each subject group to develop its own specialist subject knowledge and confidence in relation to climate change and to generate their own particular subject aims for the workshop. In the case of history, there was

substantial tutor input addressing the considerable gaps in student teachers' knowledge in relation to the history of climate change.[24]

This was followed by a second phase of preparation, when the student teachers met in groups working with peers from other subjects who they would be working with in the particular schools they would be visiting. In this way, the workshops were designed to include both a subject specialist focus as well as the idea of blending subject pedagogies. The project very much wanted to build on the different subject specific strengths amongst the student teachers while also recognising the unity of all knowledge and the need for these perspectives to connect with each other when teaching the workshops in schools.

As part of the preparation, each interdisciplinary group of student teachers needed to give particular attention to a final plenary activity, which pulled the elements from the different subject specialist workshops together and consolidated the learning from the whole workshop. The decision was taken to make the plenary 'action-focused'; far from being simply a theoretical topic, a discussion of climate change brings with it a need to also consider practical actions. Discussing the aims of an action-focused plenary, unsurprisingly, raised issues of controversy amongst the PGCE student teachers. First, we acknowledged that some of the school students we would be working with were likely to hold climate change denial or sceptical views and our limited input was unlikely to impact extensively on those views. Second, even among those who accept the reality of climate change, there were likely to be critical, but entirely legitimate, views that may prove difficult to tackle. Critical viewpoints on climate change include the idea that any response will be 'too little, too late', and that the nature and current dominance of neo-liberalism ensures that tackling climate change is unlikely to be taken seriously at a policy level.[25] While these depressing views are entirely legitimate and worthy of discussion among PGCE student teachers, we had reservations about foregrounding

these positions in schools. Not only did we have very limited time in schools during the workshops, we were also very conscious that the age of the students involved might have made tackling these more critical perspectives problematic in the time available. Engaging with the possible effects of climate change has the potential to worry and upset some children and ensuring their well being at the end of the workshop was also a priority.[26] As a result, we decided that potentially more optimistic outcomes were to be presented. We were conscious that, in doing this, we did not present the full range of views on the issue. In establishing our own values position in relation to the topic, we drew from an internet cartoon (Figure 1) as well as from the ideas of Caroline Lucas writing on the politics of hope (Figure 2).[27]

History objectives, outcomes, and activities.

The objectives were to introduce students to a little big history of climate change and the outcomes were to create a road map of climate change.

First, working in small groups, the school students were given a range of visual and textual sources and invited to create a chronological 'little big history' of climate change. The sources included a range of causes and consequences (for example, the rise in the number of witch trials as a consequence of the Little Ice Age) in order to demonstrate the interaction between climate factors and human activity (Figures 3 and 4). Second, working in small groups, students were asked to create a road map of climate change (Figures 5 and 6).

Geography objectives, outcomes, and activities

The objectives were to categorise information about climate change in terms of causes, effects and solutions and to locate the information provided about different countries on to a world map, considering if any patterns emerge in relation to the nature of the categories identified. The outcomes were to produce a world map with the information of each country categorised and located correctly; and to analyse emerging patterns regarding causes, effects, and solutions.

Working in small groups, students were given 'fact cards' about a range of causes, effects, and solutions relating to different countries. They first had to decide what category the information referred to, namely causes, effects, or solutions. They then located the countries on the world map and stuck down the 'fact cards' in the correct locations (Figure 7). Finally, they looked for patterns and prepared a short paragraph summarising what they had found to feed back to the whole group.

Science objectives, outcomes, and activities

The objectives were to enable students to evaluate scientific evidence that relates to climate change and to make informed decisions about remediating its effects. The outcomes were to produce an argument as to whether climate change is influenced by human activity; and to generate and evaluate remediation options for climate change.

First, the school students were split into small groups and circulated around four stations where they engaged with a range of data and graphical sources relating to climate change (Figure 8).[28] A student teacher facilitated each station, helping students to interpret information and asking questions that prompted students to think about whether the evidence supported or did not support the idea that human activity is significantly exacerbating climate change. Through this small group work key

scientific ideas, relating to gases and radiation, were introduced and checked for understanding. Students summarised important ideas and evidence on an A3 sheet and produced a final conclusion in which they personalised the 'human activity' by considering their personal impact on climate change. This prepared them for contributing to the final co-curricular plenary.

Second, students worked in a group with one student teacher to quickly generate a list of ways that we could ameliorate the effects of climate change (Figure 9). The student teacher then ran a discussion in which the pros and cons of those methods, from a global and personal point of view, were debated.

Final inter-disciplinary action-focused plenary

The objectives were to introduce different responses to climate change and their impacts. The outcomes were to participate in an opinion line activity.

First, student teachers modelled different individual responses to climate change. For example, one student teacher presented an argument for getting involved with politics; another argued for campaigning to ban plastic bottles in school; another explained how they were going to reduce their own personal carbon footprint. Second, students were then invited to create a human opinion line in response to the question, 'How responsible am I for climate change?' Students positioned themselves on one end of the line if they thought they were very responsible for climate change, at the other end if they thought they were not at all responsible for climate change, or placed themselves anywhere along the line to reflect their opinion. The student teachers then led a discussion with the students.

In one school, an alternative activity was used in the plenary, though still with the same learning objective (Figure 10).

Evaluation

The views of the school students were elicited via a short written questionnaire while those of the student teachers were elicited through verbal feedback. The school student views included positive comments such as 'it was a unique way of teaching' and 'it was helpful because it showed three different perspectives of climate change'. There were also less positive responses such as, 'I still stand with my opinion that climate change is not crippling to us.'

The student teacher evaluations were generally positive and included comments such as, 'working with other subjects helped me to develop my skills and to see how subjects can connect'; 'I developed my confidence running a workshop on a potentially controversial subject'; and 'it moved me beyond my 'comfort zone.''

The comments from the school students and student teachers suggest that the workshops included several valuable benefits. At the same time, they also demonstrate that changing behaviours will not necessarily be the result, confirming much research which suggests changing behaviours is difficult, slow, and incremental.[29]

The challenges of the co-curricular climate change workshops were different for each of the three subjects. For history, our experience suggested that the biggest challenge was one of securing subject knowledge in areas which have not traditionally been taught in the school history curriculum. This requires time and the identification of appropriate resources and this challenge is an ongoing one since there are currently no school texts which focus on the history of climate change.[30]

For geography student teachers, developing their own input was considered as relatively straightforward since many of them had taught climate change during their placements and they felt confident about the level of knowledge needed for Year 9. What they would have welcomed was more preparation time in their co-curricular groups; they had been given an afternoon to meet together but they did not think this was enough time to fully develop the connections between their sessions. In some schools, where staff-student ratios afforded this during the workshops, student teachers circulated to the other subject specialist workshops. This was identified as one of the key benefits by student teachers from all the subjects, since it facilitated a better understanding of different subject pedagogies, and supporting a better connection between the different subject inputs. The challenges of co-curricular working are considerable, not least in a curriculum with clear subject boundaries. Complex topics such as climate change, however, don't fit neatly within existing subject boundaries, and call for new ways of working which cut across these subject boundaries. This is a challenge for those leading, as well as those participating in, the workshops, and the evaluation of this project suggests we need to spend more time observing other subject pedagogies so that the links and connections which need to be made can be facilitated.

For science, the teaching of the concepts underpinning climate change showed itself to be an ongoing challenge. In reality the science is quite complex, and given the short time available for the project in school, the student teachers were left with the feeling that the students were dealing with the topic at a quite superficial level. The consensus view in the scientific community is that climate change has a significant anthropogenic dimension; hence many of the science student teachers were left uncomfortable that students did not always draw that conclusion and some saw little reason to take any form of personal action.[31] The student teachers felt that important social considerations had not been conveyed. However one of the key objectives of the project was to give student teachers

the opportunity to teach a controversial topic in which they were likely to encounter attitudes and beliefs different to their own and the project certainly achieved this.

Concluding remarks

Have we 'greened' the curriculum at all or reached any conclusion as to what a Green Capital school curriculum might look like? The answer to both of these ambitious aims is clearly 'no'. Indeed, we acknowledge that the approach taken in the project is largely in keeping with Ofsted's rather dismal evaluation of the teaching of sustainability which they describe as 'a peripheral issue, often confined to extra-curricular activities and involving only a minority of pupils'.[32] Nonetheless, through the project, the student teachers improved their preparedness and confidence to tackle this important topic within their own specialist subject area, whilst also benefitting from gaining a better understanding of how other subjects approach the topic. Running an action-focused plenary gave all student teachers the experience of addressing an important societal and controversial issue and the opportunity to manage the range of attitudes and beliefs that school students brought to the task. For the school students, it is impossible to know quite what the impacts were, although they will certainly have seen how different subjects all have contributions to make to a discussion of important societal concern. These are small steps certainly, but important ones as we nudge practitioners, school leaders, and hopefully policy makers too, towards a serious engagement with a 'post-carbon' curriculum.

---

[1] European Commission (2015) Available online: http://ec.europa.eu/environment/europeangreencapital/winning-cities/2015-bristol/index.html.

[2] Routledge series. Further details available online: www.routledge.com/series/PLANMAT.

[3]The PGCE stands for Post Graduate Certificate of Education and is a university-based qualification many graduates take in the United Kingdom in order to qualify as a teacher.

[4] Matthewman, S. & Morgan, J. (2013) The post-carbon challenge for curriculum subjects. *International Journal of Educational Research, 61*, pp. 93–100.

[5] For a discussion of these arguments, see Hawkey, K. (2014) 'A new look at big history' in *Journal of Curriculum Studies, 46*, no. 2, pp.163-179; and Hawkey, K. (2015) 'Moving forward, looking back - historical perspective, 'Big History' and the return of the longue durée: time to develop our scale hopping muscles'. *Teaching History, 158, A Grounding in History edition*, pp. 40-49.

[6] The idea of 'little big histories' comes from Quadackers (2014) 'To see the world in a building: a little big history of Tiananmen' in Grinn, L., Baker, D., Quadackers, E. and Korotayev, A. (eds) *Teaching and Researching Big History: Exploring a New Scholarly Field*, Volgograd: Uchitel Publishers.

[7] Kerry, T. (2015) *Cross-curricular teaching in the primary school: Planning and facilitating imaginativelessons.* London: Routledge.

[8] Bristol European Green Capital (2015) *The Bristol method: How to Bring Sustainability to Life in the Classroom.*

[9] In geography, for example, there was a focus on causes, effects and possible solutions in different parts of the world in relation to climate change. In science, there was a focus on a variety of effects of climate change such as global warming and global dimming.

[10] History National Curriculum (2014). Available online: *www.gov.uk/government/publications/national-curriculum-in-england-historyprogrammes-of-study*.

[11] Carr, E. H. (1961) *What is History?* London: Penguin, p. 30.

[12] Counsell, C. (2005) Looking through a Josephine-Butler shaped window: focusing pupils' thinking on historical significance, *Teaching History, 114, Making History Personal edition*, pp. 30-36.

[13] Shemilt, D. (2009) 'Drinking an ocean and pissing a cupful: how adolescents make sense of history' in L. Symcox and A. Wilschut (eds), *National History Standards: The Problem of the Canon and the Future of Teaching History*. Charlotte, NC: Information Age Publishing, p. 197.

[14] History National Curriculum (2014) *op cit*.

[15] See, for example, Al Gore's documentary film *An Inconvenient Truth (2006);* and Hulme, M. (2009). *Why We Disagree About Climate Change*. Cambridge: Cambridge University Press.

[16] Geography National Curriculum (2014). Available online: ww.gov.uk/government/publications/national-curriculum-in-england-geography-programmes-of-study; Department for Education (DfE) (2014) GCSE subject content for geography. Available online:www.gov.uk/government/publications/gcse-geography.

[17] For a discussion of big history see Hawkey, K. (2014); and Hawkey, K. (2015) *op cit*.

[18] Science National Curriculum (2014). Available online: www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study; Department for Education (DfE) (2014) GCSE subject content for combined science. Available online: www.gov.uk/government/publications/gcse-combined-science; Qualifications and Curriculum Authority (QCA) (2007) National Curriculum. Programme of study for Science: Key Stage 3. Available online: http://webarchive.nationalarchives.gov.uk/20110223175304/http://curriculum.qcda.gov.uk/uploads/QCA-07-3344-p_Science_KS3_tcm8-413.pdf

[19] Ross, K. (2014) Energy and Climate Change. *School Science Review*, 96, 354, pp. 15-16.

[20] See, for example, Bosworth, D., Lyonette, C. & Wilson, R. (2013) *The Supply of and Demand for High-Level STEM Skills*. UK Commission for Employment and Skills.

[21] Braund, M. & Reiss, M. (2004) *Learning Science Outside the Classroom*. New York: Routledge/Farmer.

[22] Poortinga, W., Spence, A., Whitmarsh, L., Capstick, S., & Pidgeon, N. F. (2011). Uncertain climate: An investigation into public scepticism about anthropogenic climate change. *Global Environmental Change*, *21*(3), 1015-1024

[23] Lemke, J.L. (1990) *Talking science: Language, learning and values*. Norwood, New Jersey: Ablex.

[24] Students were provided with reading material such as, Hawkey, K. (2014); and Hawkey, K. (2015) *op cit*. Other texts, cited in endnote 30, were also available.

[25] See, for example, Lovelock, J. (2008) *The Revenge of Gaia*. London: Penguin; Carter, L. (2015) Globalisation, Neoliberalism and Science Education. In J. Zajda (ed) *Second International Handbook on Globalisation, Education and Policy Research*, pp. 839-850. Netherlands: Springer.

[26] See, for example Ojala, M. (2013) Coping with Climate Change among Adolescents: Implications for Subjective Well-Being and Environmental Engagement. In *Sustainability*, 5, pp. 2191-2209.

[27] Pett, J. (2009) *USA Today*, 7th December 2009, Joel Pett's Editorial Cartoons; Lucas, C. (2015) *Honourable Friends? Parliament and the Fight for Change*. London: Portobello books, p. 105.

[28] Intergovernmental Panel on Climate Change (2001) *Third Assessment Report: Climate Change: Summary for Policy Makers*, p.3.

[29] Lorenzoni, I.,Nicholson-Cole, S., & Whitmarsh, L. (2007) Barriers perceived to engaging with climate change among the UK public and their policy implications. In *Global Environmental Change,* 17, 3-4, pp. 445–459.

[30] There are some interesting activities beginning to appear in newly published school textbooks. For example, in *Sense of History, 1509-1745* (Hodder, 2014). On one page the authors describe how they discussed what they might select as the defining event of the period. They end up selecting the famous woodcut of the execution of Charles I, and follow this up with a question, 'What does this tell us about the period?' They follow this on the next page with a different defining image that they might have chosen, namely a graph of the Mini Ice Age. This is then followed by a question to engage with, 'What does this choice tell us about the period?'

For those interested to read more about history's contribution to teaching climate change, the following texts would be useful starting points: Aldrich, R. (2010) 'Education for survival: an historical perspective. *History of Education: Journal of the History of Education Society*, 39, 1: 1-14**;** Levene, M. (2010) *Past Actions, Present Woes, Future Potential: Rethinking History in the Light of Anthropogenic Climate Change.* Warwick: Higher Education Academy. This includes a chapter by Galloway, J. 'Climate change as harbinger of disaster: population, famine and disease in the 14th century', pp. 38–46; Hughes, J. D. (2006) *What is Environmental History?* Cambridge: Polity Press; Sorlin, S. and Warde, P. (eds) (2009) *Nature's End: History and the Environment*. London: Palgrave; Spier, F. (2010) *Big History and the Future of Humanity*. London: Routledge; Steffen, W., Crutzen, P. and McNeill, J. (2007) The anthropocene: are humans now overwhelming the great forces of nature? In *Ambio*, 36, 8, pp. 614–621; Warren, L. S. (ed.) (2003) *American Environmental History*. Oxford: Blackwell.

[31] Intergovernmental Panel on Climate Change (IPCC), (2013) *Climate Change 2013: The Physical Science Basis.* Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press.

[32] Ofsted (2008) *Schools and Sustainability: A Climate for Change?* London: Ofsted.